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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/827,318	04/20/2004	Yoji Asahi	300.1158	4043
21171 7590 09/17/2008 STAAS & HALSEY LLP SUITE 700 1201 NEW YORK AVENUE, N.W. WASHINGTON, DC 20005				
EXAMINER				
TRINH, HOA B				
ART UNIT		PAPER NUMBER		
2893				
MAIL DATE		DELIVERY MODE		
09/17/2008		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/827,318

**Applicant(s)**

ASAHI ET AL.

**Examiner**

HOA B. TRINH

**Art Unit**

2893

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 13 June 2008.  
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-16 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-16 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☒ The drawing(s) filed on 20 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)  
3) ☒ Information Disclosure Statement(s) (PTO-1448 or PTO-889)  
Paper No(s)/Mail Date 6/16/08  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_  
5) ☐ Notice of Inventor's Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

#### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(c), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(c) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 06/13/2008 has been entered.

#### ***Claim Objections***

2. Claim 1 is objected to because of the following informalities: In claim 1, lines 13-14, "a resin" should be "the resin" and "an outermost layer" should be "the outermost layer".

Appropriate correction is required.

3. Claim 5 is objected to because of the following informalities: In claim 5, lines 12-13, "a resin" should be "the resin" and "an outermost layer" should be "the outermost layer".

Appropriate correction is required.

4. Claim 11 is objected to because of the following informalities: In claim 5, lines 14-15, "a resin" should be "the resin" and "an outermost layer" should be "the outermost layer".

Appropriate correction is required.

#### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
  2. Ascertaining the differences between the prior art and the claims at issue.
  3. Resolving the level of ordinary skill in the pertinent art.
  4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).
4. Claims 1-10, 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abe (Pub. No. US 2003/0136577).

Abe discloses, as to claims 1, 5, 9, 16, a semiconductor device substrate comprised of a core substrate 10 (fig. 1) on both surfaces of which interconnect patterns 20 (20a, 20b), 24, 28 (fig. 1) are formed via a resin layer 14 (fig. 1), wherein the core substrate 10 is formed by a material (page 4, Table 1, paragraph [0053]) having a heat expansion coefficient, and a (first/outermost) resin layer 30 (fig. 1, page 3, paragraph [0045] and page 4, paragraph [0063], Table 1) is an outermost layer of the substrate 10 on each of the main surfaces thereof of a

material having at least one of a higher strength and a higher elongation than a resin material used for (second) inner resin layers 22 and 26 (fig. 1) in the substrate 10, and an outermost interconnect pattern 28 (fig. 1) of the semiconductor device substrate is coated by the resin layer 30 (fig. 1) forming the outermost layer of the semiconductor device substrate, and the outermost interconnect pattern 28 having a land (uncovered portions of the pattern 28) exposed through the outermost layer formed of the resin 30 (fig. 1; paragraph [0045]).

However, Abe does not explicitly state that the material for the core substrate is selected so that it is closer to that of a semiconductor chip than the respective heat expansion coefficients of the (third) main resin layers 14 (fig. 1) and the interconnect patterns 20, 24, 28 (fig. 1), wherein the core substrate 10 having respective interconnects patterns 24, 28 (fig. 1) extends through the resin layers 14, 22, 26, 30 (fig. 1).

Nonetheless, it would have been obvious to one of ordinary skill in the art at the time the invention was made to construct the invention of Abe with the selection of materials as provided in Table 1, since it is a prima facie obvious to an artisan for optimization and experimentation to select the available materials in Table 1 for the advantage of preventing cracking, deformation, and other problems arising in the substrate due to the thermal stress occurring between the core substrate and the inner resin layers in the substrate and interconnect patterns in the substrate (see page 4, [0063]).

Note: The resin layers 14, 22, 26, 30 (fig. 1) may be selected among the disclosed group of materials (page 4, [0063]) so as to provide the outermost layer with the higher strength and elongation than the inner layer because the results are predictable.

Furthermore, when there is motivation: to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has a good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense. In that instance the fact that a combination was obvious to try might show that it was obvious under § 103. *KSR International Co. v. Teleflex Inc.*, 550 U.S. --, 82 USPQ2d 1385 (2007), KSR, 127 S. Ct. at 1742. These embodiments/materials demonstrate that there were a finite number of known techniques/materials for making a circuit board with high rigidity and reliability. The skilled artisan would have had good reason to try these materials, including core substrate material with a heat expansion of 4-10 ppm/<sup>o</sup>C, with a reasonable expectation of success. Thus, selecting the core substrate material with the heat expansion and the heat coefficient as claimed in the device is "the product not of innovation but of ordinary skill and common sense." KSR, 127 S. Ct. at 1742.

Moreover, Further, it has been held within a general skill of an artisan in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

As to claims 2 and 6, Abe further discloses that a resin layer 26 (fig. 1, page 3, paragraph [0045] and page 4, paragraph [0063], Table 1) under the resin layer 30 (fig. 1) forming the outermost layer of the substrate 10 is made of a resin material having at least one of a higher strength and higher elongation than the resin material of the resin layer 14 or 22 (fig. 1) used further inside the substrate 10 (fig. 1).

As to claims 3, 10, and 7, Abe further discloses that the resin material forming the outermost layer 30 has a fracture strength of at least 90 Mpa and elongation of at least 10%. (See page 4, paragraph [0063], Table 1) Note: example of such material is a polyimide resin.

As to claims 4, and 8, Abe discloses the resin material forming the outermost layer 30 (fig. 1) has a fracture strength of at least 90 Mpa and elongation of at least 10%. (See page 4, paragraph [0063], Table 1) Note: example of such material is a polyimide resin.

5. Claims 11-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abe in view of Nair (2004/0095734).

Abe discloses the invention substantially as claimed in the above rejection of claim 1, except that the core substrate being of a metal alloy.

Nair discloses an analogous device having a core substrate 211 (fig. 2E) made of an iron-nickel alloy (see page 2, paragraph [0026]) for providing a high capacitance substrate.

Therefore, as claims 11-15, it would have been obvious to one of ordinary skills in the art at the time the invention was made to have the material of the core substrate of Abe with the iron nickel alloy material, as taught by Nair, for providing the advantage as mentioned in the above.

Further, it has been held within a general skill of an artisan in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice.

In re Leshin, 125 USPQ 416.

### ***Response to Arguments***

1. Applicant's arguments filed 6/13/2008 have been fully considered but they are not persuasive.

Regarding to applicants' arguments, the amended portions in the claims fail to overcome the cited reference. (See rejection above). Abe teaches the core substrate having on both sides the resin layers and interconnect patterns as claimed.

With respect to applicants' allegation that Abe does not explicitly teach a resin with a high strength and elongation used in the outermost layer. The examiner notes that there are a finite number of materials listed in Table 1 of Abe for the resin layers and it has been held within a general skill of a worker to select the known material. It would have been obvious to an artisan to select the known material with the properties as claimed. Thus, claims 1, 5, 9 and their dependent claims fail to overcome the cited reference.

Regarding to claims 11-15, applicants allege that Abe teaches a metal alloy that has a thermal coefficient expansion larger than silicon. First, applicants' argument is flawed because applicants fail to particularly point out which material in Table 1 is the metal alloy taught by Abe. Second, the examiner uses Nair for the teaching of a metal alloy as claimed which cures Abe's deficiency. See the rejection above. New claim 16 also fails to overcome the cited reference.

Note that it has been held within a general skill of an artisan in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice.

In re Leshin, 125 USPQ 416.



### **Conclusion**

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to (Vikki) Hoa B. Trinh whose telephone number is (571) 272-1719. The Examiner can normally be reached from Monday-Friday, 9:00 AM - 5:30 PM Eastern Time. If attempts to reach the examiner by telephone are unsuccessful, the Examiner's supervisor, Ms. Davienne Monbleau, can be reached at (571) 272-1945. The office fax number is 571-273-8300.

Any request for information regarding to the **status** of an application may be obtained from the **Patent Application Information Retrieval (PAIR) system**. Also, status information for published applications may be obtained from either Private PAIR or Public Pair. In addition, status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. If you have questions pertaining to the Private PAIR system, please contact the Electronic Business Center (EBC) at 866-217-9197 (toll free).

Lastly, paper copies of cited U.S. patents and U.S. patent application publications have ceased to be mailed to applicants with Office actions since June 2004. Paper copies of foreign patents and non-patent literature will continue to be included with office actions. These cited U.S. patents and patent application publications are available for download via the Office's PAIR. As an alternate source, all U.S. patents and patent application publications are available on the USPTO web site ([www.uspto.gov](http://www.uspto.gov)), from the Office of Public Records and from commercial sources. Applicants are referred to the Electronic Business Center (EBC) at <http://www.uspto.gov/ebc/index.html> or 1-866-217-9197 for information on this policy.

Art Unit: 2893

Requests to restart a period for response due to a missing U.S. patent or patent application publications will not be granted.

/(Vikki) Hoa B Trinh/

Examiner, Art Unit 2893